

Exempt well case study

Six of the Seven Ground Water Investigation Program investigations were related to exempt wells. Data from these studies could be compiled and presented to compare the impact of exempt wells on a range of hydrologic conditions. What is the effect of exempt wells in each of these areas with respect to stream flow, ground water levels, ground water availability?

Stream depletion modeling to evaluate potential areas of high impact

Some states are considering what is called a response function approach where potential ground water development and stream depletion are modeled. The models show the amount and location of potential impact to surface water flow. This is used to establish aquifers where "non-futile" calls would be possible. These models also present the predicted impact of pumping on multiple streams. Conversely, during drought years, it has been suggested that ground water pumping could be used to augment stream flow during extreme low flow conditions in critical reaches. Can these critical reaches be identified?

Stream Depletion reset by basin recharge

Stream depletion by groundwater development can take many years or many decades to fully develop. Greater than normal (long-term average) precipitation can offset some or all of the depletion in progress. What is the long-term effect in climate variation on long-term stream depletion?

One well versus many

Consider well density – one well versus many

- no difference at an appropriate distance from the pumping center
- no hydrologic logic for exempt wells vs water supply wells
- well interference more likely in high density areas

Montana Geology vs other states

Montana's hydrogeology, particularly in the western third, is unique. Long (50 to 100 miles), narrow (5 miles) intermontane alluvial/fluvial valleys with moderate snow-dominated precipitation are the principle aquifer – no other state exhibits these conditions. How do these differences relate to how water is managed?

Altered watershed hydrology

There are few, if any, natural groundwater flow systems in western Montana. Nearly all of the intermontane valleys are irrigated and sub-irrigated (recharged) by surface water diversions. How would changes in surface water diversions used to offset groundwater development affect this new equilibrium? When does an artificial recharge system become the new baseline? There are several examples of wetlands and groundwater dependent ecosystems that rely on irrigation return flows.

Is it time to re align the exemption to actual use?

GWAP, GWIP and other studies suggest/support a 2 acre-feet per year actual use. How many wells could be affected, how much water "saved" by change from 10 acre-feet per year? What would be the volume saved or if physical availability, legal availability, and actual use were aligned?